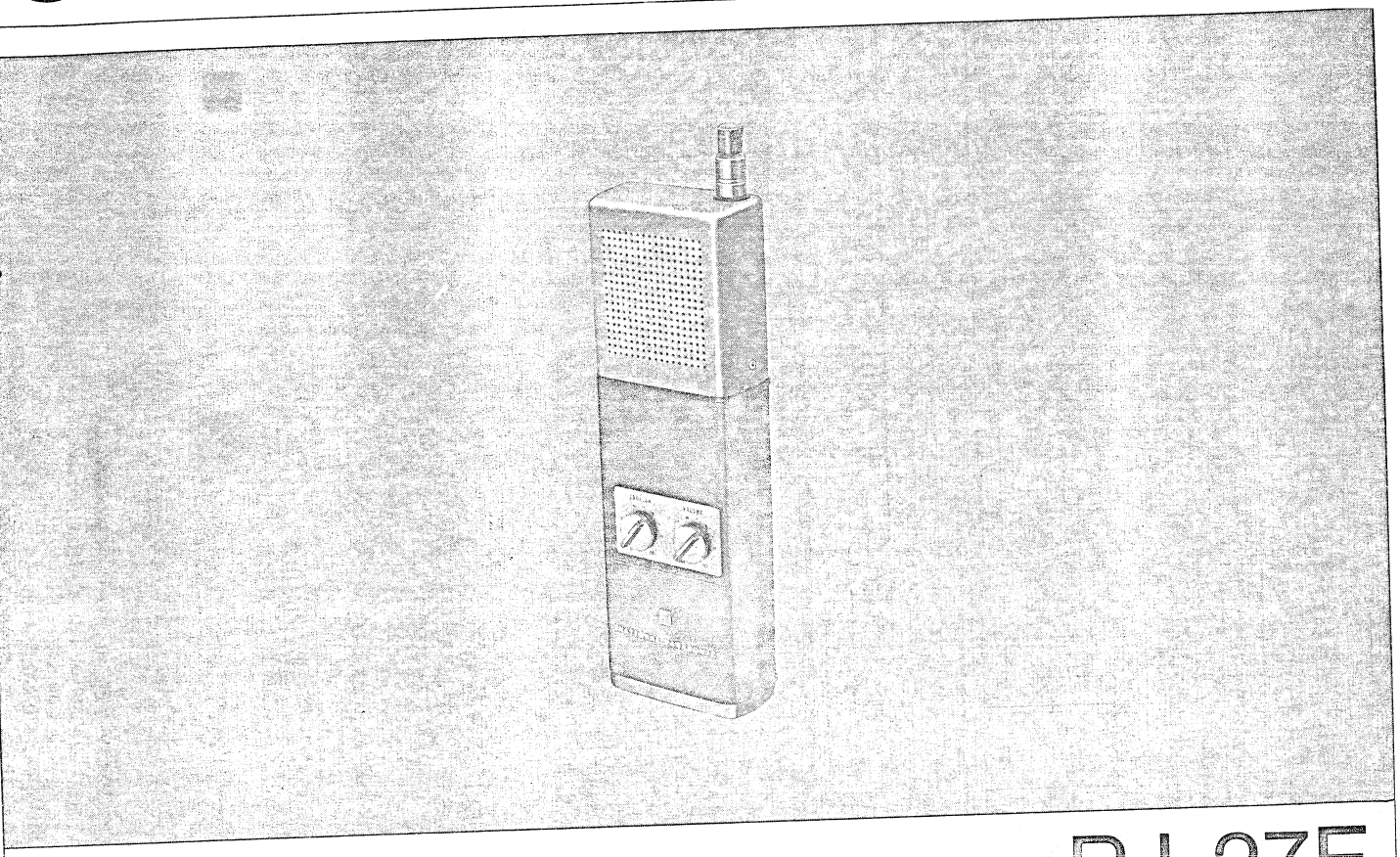
Service Manual

NATIONAL
RADIO
PANASONIC

RJ-27E



27 MHz CITIZEN BAND TRANSCEIVER

MODEL RJ-27E

■ SPECIFICATIONS

Frequency:	27 MHz
Intermediate Frequency:	455 kHz
Sensitivity:	1 μV for 50mW Output
Receiver Power Output:	400mW
Transmitter Power Output:	100mW Maximum
Batteries:	12V (Eight "AA" Size Penlight Batteries) (NATIONAL UM-3 or equivalent)
Speaker/Microphone:	6 cm (2¼") PM Dynamic Speaker
Dimensions:	80(Wide)×237(High)×41(Deep) mm (3 5/32"×9 11/32"×1 5/8")
Weight:	640g. (1 lb. 6.6 oz.) without batteries
Impedance:	Speaker..... 8Ω Earphone Jack..... 8Ω

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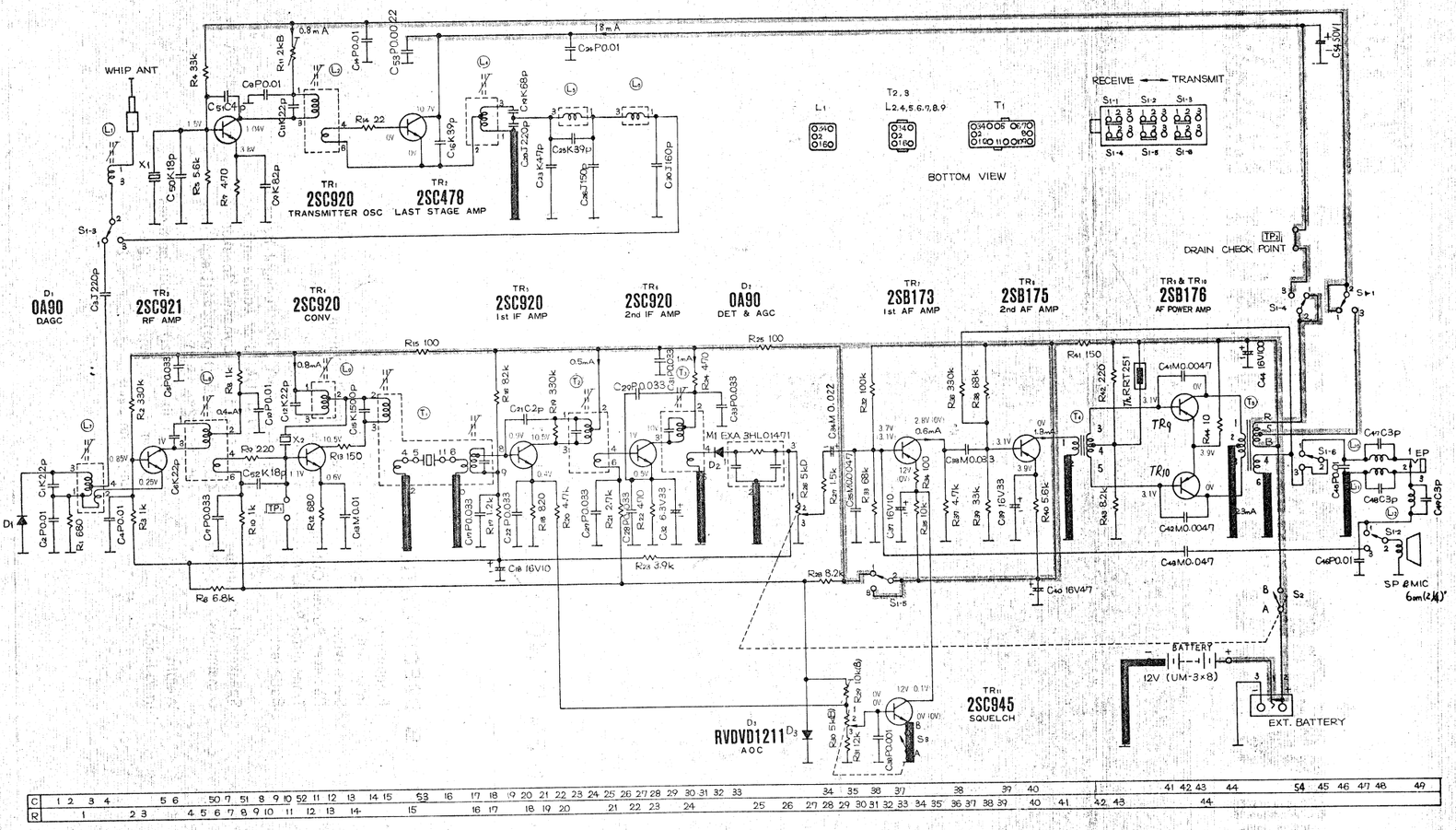
ORDER NO. RD-863

Schematic Diagram – Model RJ-27E

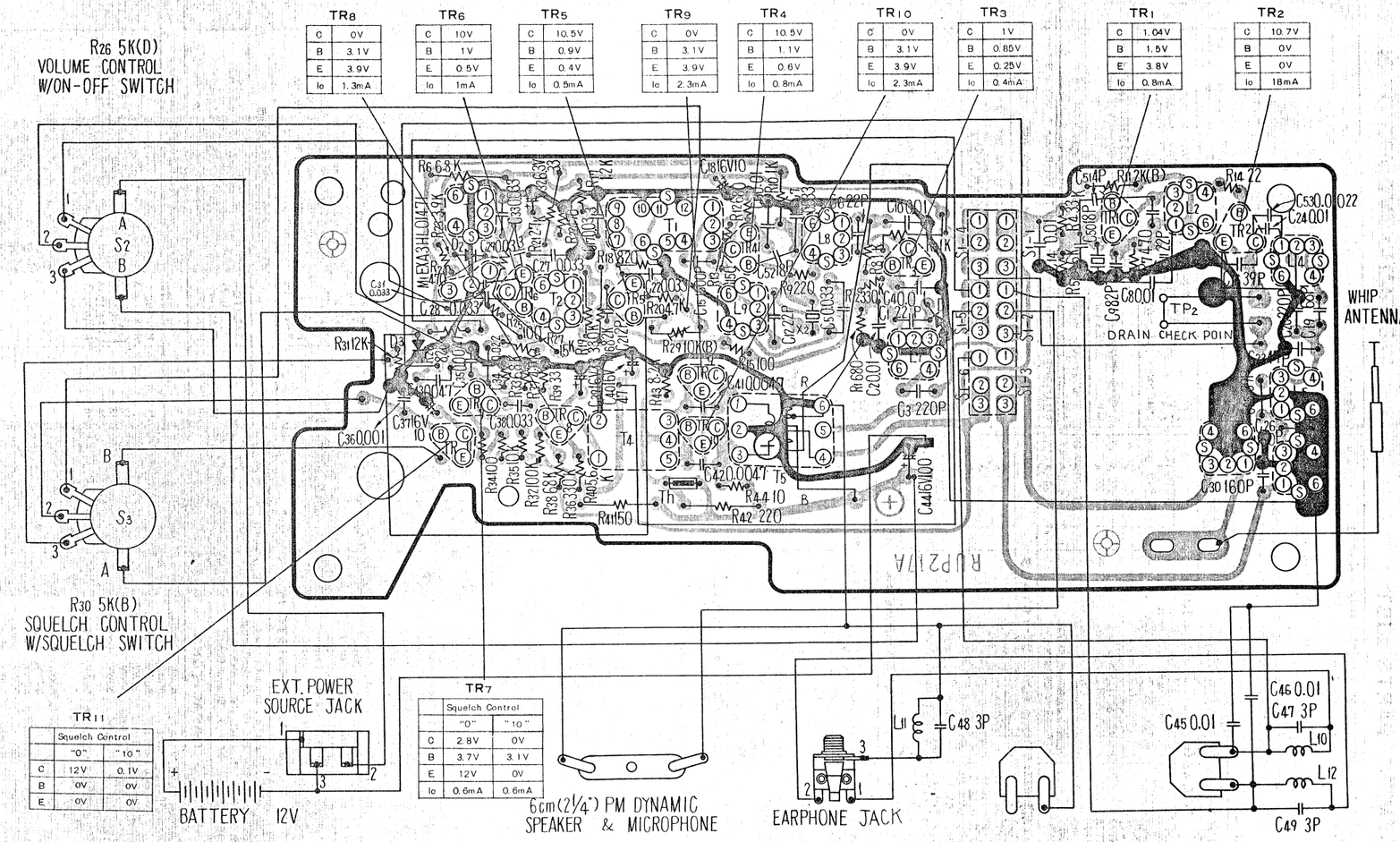


Notes:

1. When replacement of a transistor is necessary, realignment may be necessary.
2. S1-1~S1-6: Push to talk switch in "RECEIVE" position.
3. S2: Power source switch in "OFF" position.
4. S3: Squelch control in "0" position.
5. DC voltage measurements are taken with circuit tester 10KΩ/V from negative terminal of battery.
   ( ) Voltage of TR7 & TR11 is at the "10" position of the Squelch Control.
6. Battery current: Receiver.....13mA (at no input signal)
   .....60mA (at maximum output)
   Transmitter.....30mA (at no modulation)

Positive Voltage Line
Negative Voltage Line

Circuit Board Wiring View – Model RJ-27E



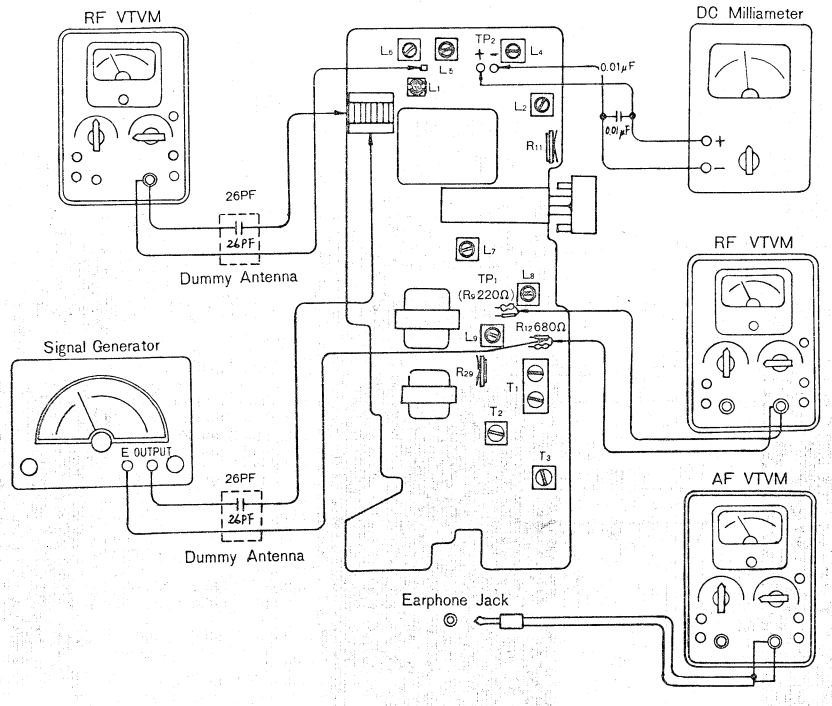
TR&D	D3	D2	TR11	TR7	TR6	TR8	TR5	TR9	TR10	TR4	TR3	D1	TR1	TR2
T&L	T3		T2		T4	T1	L9	T5	L8		L11	L7	L2 L1	L4 L5 L6 L10 L12

Positive Voltage Line
Negative Voltage Line

ALIGNMENT INSTRUCTIONS

Notes:
1. Set volume control to maximum.
2. Set squelch control to "0" or "10". (Squelch Alignment)
3. Set push to talk switch to Receiver or Transmitter. (Transmitter Alignment.)
4. Set power source voltage to 12 volts.
5. Remove whip antenna from cabinet.
6. Remove shorting link from its terminals and mount it after completing alignment.
7. Output of signal generator should be no higher than necessary to obtain an output reading.

	SIGNAL GENERATOR	ADJUSTMENT	REMARKS
		TRANSMITTER ALIGNMENT	
1	———	L_2 (OSC COIL)	Adjust L_2 for maximum indication on milliameter and back down ¼ turn.
2	———	L_4 (LAST STAGE COIL)	Adjust L_4 for minimum indication on milliameter.
3	———	L_6 (FILTER COIL)	Adjust L_6 for minimum indication on milliameter.
4	———	L_1 (LOADING COIL)	Adjust L_1 for maximum indication on VTVM with RF Prove.
5	———	R_{11} (CURRENT CONTROL)	Adjust R_{11} for 18 mA milliamter reading.
6	Repeat Steps 1 through 5.		
		RECEIVER ALIGNMENT	
7	27 MHz Band 1000 Hz 30% Mod.	L_9 (OSC COIL)	Adjust L_9 for abrupt indication on RF VTVM, then turn ¾ turn upwards.
8	〃	T_1, T_2, T_3 (IFT)	Adjust T_1～T_3 for maximum audio output.
9	〃	L_8 (DET COIL)	Adjust L_8 for maximum audio output.
10	〃	L_7 (ANT COIL)	Adjust L_7 for maximum audio output.
11	Repeat Steps 7, 9 & 10.		
		SQUELCH ALIGNMENT	
12	〃	R_{29} (SQUELCH CONTROL)	Adjust R_{29} for 50 mW audio output.



Recommended Equipment Connections

per Set (Pcs.)	Remarks
1	C
1	C
2	C
1	C
1	C
3	C
1	C
1	C
1	C
1	B
2	B
1	B
1	B
1	B
1	B
1	B
1	A
1	A
1	Ⓝ A
1	Ⓝ Ⓒ C
1	Ⓝ C
1	B
1	C
1	C
2	B
1	C
2	B
1	C
1	C
1	B
1	C
1	B
1	C
2	C
1	B
1	C
1	B
1	C
1	B
1	C
2	C
1	B
1	Ⓝ B
1	C
2	B
1	Ⓝ C
1	B
1	B
1	B
1	C
1	B
1	Ⓝ B
1	C
1	C
3	C
1	A
2	A
4	B
2	B
1	B
1	C
1	C
1	B
1	B
1	B
1	C
1	C
1	C
5	B
1	B
1	B
1	B
1	C
1	Ⓝ C
(1)	Ⓝ C
(1)	C
(1)	C
1	Ⓝ B

■ TO REMOVE CHASSIS

1. Remove two (2) control knobs from cabinet front.
2. Remove four (4) upper cover screws, nos. 1~4, as illustrated in fig. 1.
3. Pull upper cover in the direction of arrow as illustrated in fig. 1.
4. Remove battery cover by turning battery cover screw (No. 5), towards "OPEN" as illustrated in fig. 1.
5. Remove three(3) cabinet back cover screws, nos. 1~3, as illustrated in fig. 2.
6. Remove cabinet back cover.
7. Remove whip antenna screw, no. 4, as illustrated in fig. 3. (When removing screw, be careful not to break volume control terminals.)
8. Remove five (5) red chassis screws, nos. 1, 2, 3, 5 & 6, as illustrated in fig. 3.
9. To remove chassis completely, unsolder leadwires to lead holder, EXT power source jack & speaker terminals.
10. To reassemble chassis, reverse the above procedures noting the following.

Notes:

1. Tighten all mounting screws.
2. When mounting cover, apply silicon grease to the rubber or the "Push To Talk Switch" and insert cover into cabinet pressing the rubber.
3. Insert knob fully.

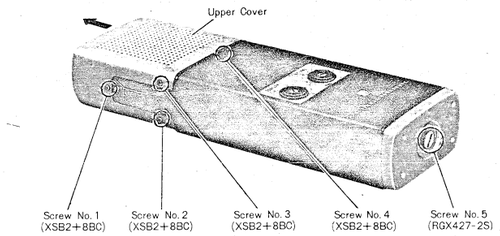


Fig. 1

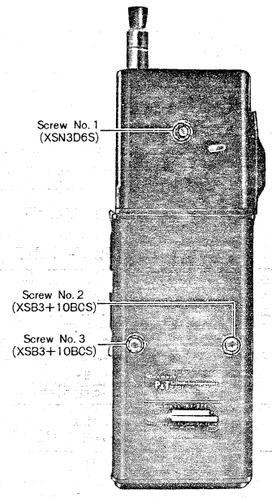


Fig. 2

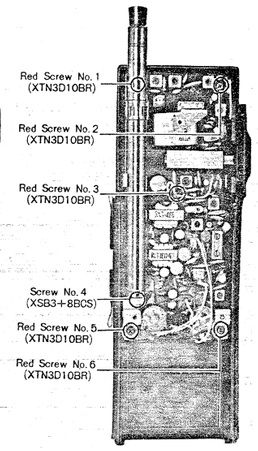
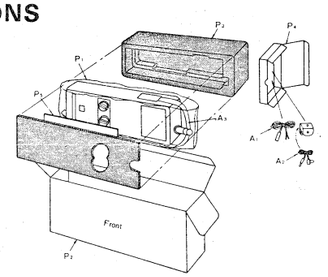
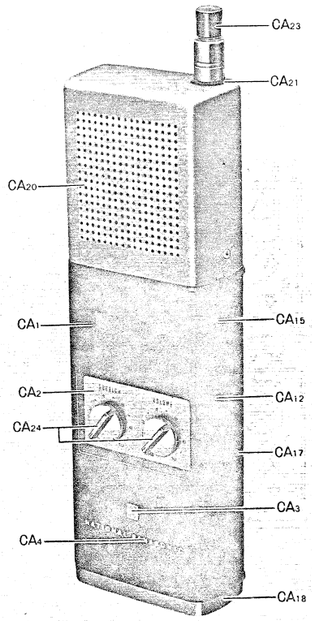

Red Screw No. 1 (XTN3D10BR)
Red Screw No. 2 (XTN3D10BR)
Red Screw No. 3 (XTN3D10BR)
Screw No. 4 (XSB3+8BCS)
Red Screw No. 5 (XTN3D10BR)
Red Screw No. 6 (XTN3D10BR)

Fig. 3

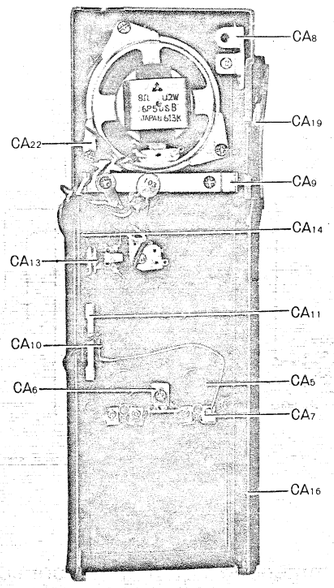
■ ACCESSORIES & PACKING PARTS LOCATIONS

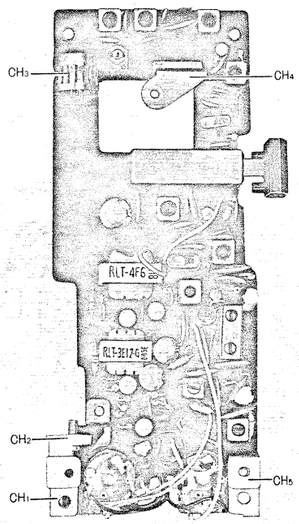


■ CABINET PARTS LOCATIONS



■ CHASSIS PARTS LOCATIONS





■ REPLACEMENT PARTS LIST

NOTES:
1. Part numbers are indicated on most mechanical parts. Please use this Part number for parts orders.
2. Ⓝ indicates the New Parts.
3. Gothic part No indicates the Service Standard Parts. Production part No is indicated in ( ).
4. A~C rank: **A** rank parts will cover 80% of repair needs. **A+B** rank parts will cover 95% of repair needs. **C** rank parts are less necessary.

Ref. No.	Part No.	Description	Per Set (Pcs.)	Remarks
TRANSISTORS AND DIODES				
TR1, 4, 5, 6	2SC920	Transmitter Oscillator, Converter, 1st, 2nd IF Amplifier	4	A
TR2	2SC478	Last Stage Amplifier	1	A
TR3	2SC921	RF Amplifier	1	A
TR7	2SB173	1st AF Amplifier	1	A
TR8	2SB175	2nd AF Amplifier	1	A
TR9, 10	2SB176	AF Power Amplifier (push-pull)	2	A
TR11	2SC945	Squelch	1	A
D1, 2	OA90	D. AGC, Detector & AGC	2	A
D3	RVDVD1211	Operation Compensator	1	Ⓝ A
THERMISTOR AND CRYSTALS				
Th	RRT251	Temperature Compensator	1	A
X1	RVCY26965B1T	Transmitter (1 pair)	1	A
X2	RVCY27420D4R	Receiver (1 pair)	1	A
X1	RVCY27045B1T	Transmitter (1 pair)	1	A
X2	RVCY27500D4R	Receiver (1 pair)	1	A
X1	RVCY27155B1T	Transmitter (1 pair)	1	A
X2	RVCY27610D4R	Receiver (1 pair)	1	A
X1	RVCY27225B1T	Transmitter (1 pair)	1	A
X2	RVCY27680D4R	Receiver (1 pair)	1	A
COILS AND TRANSFORMERS				
L1	RLA7N5-T	Loading Coil	1	A
L2	RL07B8-T	Transmit Oscillator Coil	1	Ⓝ A
L4	RLA7B6-T	Transmit Last Stage Coil	1	Ⓝ A
L5	RLA7B7-T	Transmit Filter Coil	1	Ⓝ A
L6	RLA7B8-T	Transmit Filter Coil	1	Ⓝ A
L7	RLA7B4-T	Receiver Antenna Coil	1	A
L8	RLD7B4-T	Receiver Detector Coil	1	A
L9	RL07B5-T	Receiver Oscillator Coil	1	A
L10, 11, 12	RL0Y25S-5	Trap Coil	3	B
T1	RLI7W101-T	Ceramic Filter	1	A
T2	RLI2B250-M	2nd IF Transformer	1	A
T3	RLI2B450-M	3rd IF Transformer	1	A
T4	RLT3E12	Input Transformer, P=8KΩ; S=4KΩ	1	A
T5	RLT4F6	Output Transformer, P=700Ω; S=8Ω	1	A
RESISTORS				
R44	ERD18VJ100	10Ω, ⅛Watt, Carbon	1	B
R14	ERD18VJ220	22Ω, ⅛Watt, Carbon	1	B
R15, 25, 34	ERD18VJ101	100Ω, ⅛Watt, Carbon	3	B
R13	ERD18VJ151	150Ω, ⅛Watt, Carbon	1	B
R7, 22	ERD18VJ471	470Ω, ⅛Watt, Carbon	2	B
R1	ERD18VJ681	680Ω, ⅛Watt, Carbon	1	B
R18	ERD18VJ821	820Ω, ⅛Watt, Carbon	1	B
R8, 10	ERD18VJ102	1KΩ, ⅛Watt, Carbon	2	B
R17	ERD18VJ122	1.2KΩ, ⅛Watt, Carbon	1	B
R23	ERD18VJ392	3.9KΩ, ⅛Watt, Carbon	1	B
R20, 37	ERD18VJ472	4.7KΩ, ⅛Watt, Carbon	2	B
R5, 40	ERD18VJ562	5.6KΩ, ⅛Watt, Carbon	2	B
R28, 43	ERD18VJ822	8.2KΩ, ⅛Watt, Carbon	2	B
R35	ERD18VJ103	10KΩ, ⅛Watt, Carbon	1	B
R31	ERD18VJ123	12KΩ, ⅛Watt, Carbon	1	B
R4, 39	ERD18VJ333	33KΩ, ⅛Watt, Carbon	2	B
R33, 38	ERD18VJ683	68KΩ, ⅛Watt, Carbon	2	B
R32	ERD18VJ104	100KΩ, ⅛Watt, Carbon	1	B
R2, 36	ERD18VJ334	330KΩ, ⅛Watt, Carbon	2	B
R41	ERD18TJ151	150Ω, ⅛Watt, Carbon	1	B
R27	ERD18TJ152	1.5KΩ, ⅛Watt, Carbon	1	B
R9, 42	ERD18TJ221	220Ω, ⅛Watt, Carbon	2	B
R24	ERD18TJ471	470Ω, ⅛Watt, Carbon	1	B
R3	ERD18TJ102	1KΩ, ⅛Watt, Carbon	1	B
R21	ERD18TJ272	2.7KΩ, ⅛Watt, Carbon	1	B
R12	ERD18TJ681	680Ω, ⅛Watt, Carbon	1	B
R6	ERD18TJ682	6.8KΩ, ⅛Watt, Carbon	1	B
R16	ERD18TJ823	82KΩ, ⅛Watt, Carbon	1	B
R19	ERD18TJ334	330KΩ, ⅛Watt, Carbon	1	B
VARIABLE RESISTORS				
R11	EVLT0AA00B23	2KΩ (B), Current Control	1	A
R29	EVLT0AA00B14	10KΩ (B), Squelch Control	1	A
R26	EVHB0BL15D53	5KΩ (D), Volume Control	1	A
R30	EVHB0BL15B53	5KΩ (B), Squelch Control	1	A
CAPACITORS				
C21	ECCD05020C	2mmf, 50WV, Ceramic	1	C
C47, 48, 49	ECCD05030C	3mmf, 50WV, Ceramic	3	C
C51	ECCD05040C	4mmf, 50WV, Ceramic	1	C
C13	ECKE05103MY	0.01mfd, 50WV, Ceramic	1	C
C36	ECKD05102P	0.001mfd, 50WV, Ceramic	1	C
C2, 4, 8, 10, 14 24, 45, 46	ECKE05103P	0.01mfd, 50WV, Ceramic	8	C
C5, 7, 17, 22, 27, 28, 29, 31, 33	ECKE05333P	0.033mfd, 50WV, Ceramic	9	C
C53	ECKD5222P	0.0022mfd, 500WV, Ceramic	1	C
C50, 52	ECMS05180K-H	18mmf, 50WV, Mica	2	C
C1, 6, 11, 12	ECMS05220K-H	22mmf, 50WV, Mica	4	C
C25, 16	ECMS05390K-H	39mmf, 50WV, Mica	2	C
C23	ECMS05470K-H	47mmf, 50WV, Mica	1	C
C19	ECMS05680K-H	68mmf, 50WV, Mica	1	C
C9	ECMS05820K-H	82mmf, 50WV, Mica	1	C
C30	ECMS05161J-H	160mmf, 50WV, Mica	1	C
C3, 20	ECMS05221J-H	220mmf, 50WV, Mica	2	C
C26	ECMS05151J-H	150mmf, 50WV, Mica	1	C
C15	ECQS05152KZ	1500mmf, 50WV, Styrol	1	C
C35, 41, 42	ECQG05472MZ-N	0.0047mfd, 50WV, Polyester	3	C
C38	ECQG05333MZ-N	0.033mfd, 50WV, Polyester	1	C
C43	ECQG05473MZ-N	0.047mfd, 50WV, Polyester	1	C
C34	ECQG05223MZ-N	0.022mfd, 50WV, Polyester	1	C
C32	ECEA6V33	33mfd, 6.3WV, Polyester	1	B
C18, 37	ECEA16V10	10mfd, 16WV, Polyester	2	B
C39	ECEA16V33	33mfd, 16WV, Polyester	1	B
C40	ECEA16V47	47mfd, 16WV, Polyester	1	B
C44	ECEA16V100	100mfd, 16WV, Polyester	1	B
C54	ECEA50V1	1mfd, 50WV, Polyester	1	B
COMPONENT COMBINATION				
M1	EXA3HL01471	0.01mfd×2, 470Ω	1	B
SWITCH				
S1-1~S1-6	RSH5-2	Push To Talk Switch	1	A
SPEAKER				
SP	EAS6P50SB	6cm (2¼") PM Dynamic Speaker, 8Ω	1	A
CABINET				
	RYARJ27EX	Cabinet (Complete)	1	Ⓝ A
	RYMRJ27EX	Cabinet Front (Complete)	1	Ⓝ C
CA1	RKM1902S	Cabinet Only	1	Ⓝ C
CA2	RGK263	Indicating Plate, SQUELCH/VOLUME Mark	1	B
CA3	RGB33	Badge, National Mark	1	C
CA4	RGB305	Badge, NATIONAL PANASONIC Mark	1	C
CA5	RHG934	Rubber, Knob	2	B
CA6	RUL181S	Bracket, Battery Case	1	C
CA7	RJT723	Terminal, Battery Case	2	B
CA8	RUL185	Bracket, Cabinet Back Cover	1	C
CA9	RBX55-2	Bracket, Cabinet Back Cover	1	C
CA10	RJJ47-1	Jack, EXT Power Source	1	B
CA11	RMK125	Bracket, Jack	1	C
CA12	RUV238	Cover, Jack	1	B
	RHG638	Rubber, Jack	1	C
	XSB2+8BC	Screw, Jack M'tg	2	C
CA13	RJJ25	Jack, Earphone	1	B
CA14	RMK123	Bracket, Earphone Jack	1	C
CA15	RUV237	Cover, Earphone Jack	1	B
	RHG933	Rubber, Earphone Jack	1	C
	RGX420	Ornament, Earphone Jack	1	C
	XSB2+8BC	Screw, Earphone Jack M'tg.	2	C
CA16	RUV239-1	Rubber, Cabinet	1	B
	RYF1RJ27EX	Cover (Complete), Cabinet Back	1	Ⓝ B
CA17	RKF1531	Cover Only, Cabinet Back	1	C
	RHG935-1	Rubber, Cabinet Back Cover	2	B
	RGT242A	Name Plate	1	Ⓝ C
CA18	RKK270	Cover, Battery Compartment	1	B
	RJK3805	Case, Battery	1	B
	RGX427-2S	Screw, Battery Cover M'tg.	1	B
	RNT303	Lock Washer, Cover M'tg.	1	C
	RHE20	Washer, Cover M'tg.	1	C
CA19	RHG936	Rubber, Push To Talk Switch	1	B
	RYF2RJ27EX	Cover (Complete), Cabinet Upper	1	Ⓝ B
CA20	RKF1531	Cover Only, Cabinet Upper	1	C
CA21	RMX185	Bracket (Black), Whip Antenna	1	C
CA22	RMS13-1	Bracket, Speaker	3	C
CA23	XEARBV159LAS	Whip Antenna	1	A
CA24	RBN190	Knob, Volume & Squelch	2	A
	XSB2+8BC	Screw, Cabinet Upper Cover M'tg.	4	B
	XSB3+10BCS	Screw, Cabinet Back Cover M'tg.	2	B
	XSN3D6S	Screw, Cabinet Back Cover M'tg.	1	B
CHASSIS				
CH1	RUL184S	Bracket, Cabinet Back Cover	1	C
	RUL108	Lock Washer, Whip Antenna M'tg.	1	C
CH2	RMX145-2	Bracket, Whip Antenna	1	B
	XSB3+8BCS	Screw, Whip Antenna M'tg.	1	B
CH3	RJT722	Terminal, Whip Antenna	1	B
CH4	RUL179S	Bracket, Cabinet Back Cover	1	C
CH5	RUL182-1S	Bracket, Cabinet Back Cover	1	C
	RMY1-4	Heat Sink, Transistor (TR9, 10)	1	C
	XTN3D10BR	Red Screw, Chassis M'tg.	5	B
ACCESSORIES				
A1	EAE1TB-2 (EAE1FB)	Magnetic Earphone, 8Ω	1	B
A2	RJA23-4	AC Cord, EXT Power Source	1	B
A3	RQK157-1	Shoulder Bag (with Earphone Case)	1	B
PACKING				
P1	RPP180	Polyethylene Cover	1	C
	RPK9121A	Gift Box (Complete)	1	Ⓝ B
P2	RPG626A	Packing Case (Supply as RPK9121A)	(1)	Ⓝ C
P3	RPK213A	Gift Box (Supply as RPK9121A)	(1)	C
P4	RPE106A	Accessory Box (Supply as RPK9121A)	(1)	C
P5	RQX5335A	Instruction Book	1	Ⓝ B

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